**Chemistry Unit Test Review 2016**

**Part 1**

**Multiple Choice:** circle the best answer to each question.

1. While cleaning out your parents’ garage, you find a container with some liquid still in it. The label has almost disappeared from the container, but you can see a symbol on the container like the one shown. What does this symbol tell you about the contents of the container?

|  |  |
| --- | --- |
| hhps warning corrosive | * 1. They contain the bony hands of skeletons.   2. They are explosive.   3. They are corrosive.   4. They are poisonous.   5. They are incredibly tasty with french fries. |

1. Which of the following statements based on the particle theory of matter is INCORRECT?
   1. Different substances are made of different kinds of particles.
   2. The particles of a solid substance are always moving.
   3. The spaces between particles are large in comparison to the particles themselves.
   4. The attraction between particles in a liquid is weaker than in a gas.
2. You become thirsty while backpacking through Asia and are looking for something to drink when you stumble across a sealed bottle filled with a clear liquid. You cannot speak or read the language on the container’s label, so you cannot tell what the liquid is. Fortunately, the label has a symbol container like the one shown. What can you tell about the liquid?

|  |  |
| --- | --- |
| hhps danger explosive | * 1. It is explosive.   2. It is corrosive.   3. It emits dangerous radiation and particles.   4. It is used for creating works of abstract art.   5. It is flammable. |

1. Which of the following statements is INCORRECT?
   1. Noble gases have completely filled outer orbitals.
   2. All physical changes, such as a change of state or breaking, are reversible.
   3. Gold is a very malleable and ductile metal.
   4. As gases cool, they occupy smaller volumes.
2. Which of the following statements is INCORRECT?
3. The spaces between particles in a liquid are greater than those in a solid.
4. Liquids have definite, fixed volumes and indefinite shapes
5. Gases have indefinite volumes and indefinite shapes.
6. The attraction between particles increases as the space between particles increases.
7. Ketchup flows more slowly than malt vinegar when poured over French fries. Which of the following statements correctly describes this physical property?
8. Ketchup is superior to salt and malt vinegar for fish and chips.
9. Ketchup is more soluble than malt vinegar.
10. Ketchup is less ductile than malt vinegar.
11. Ketchup has a higher viscosity than malt vinegar.
12. Which of the following is NOT a chemical property?
    1. Reacts with acid c) Combustibility/flammability

b) Rusts or tarnishes d) Melts from solid to liquid state

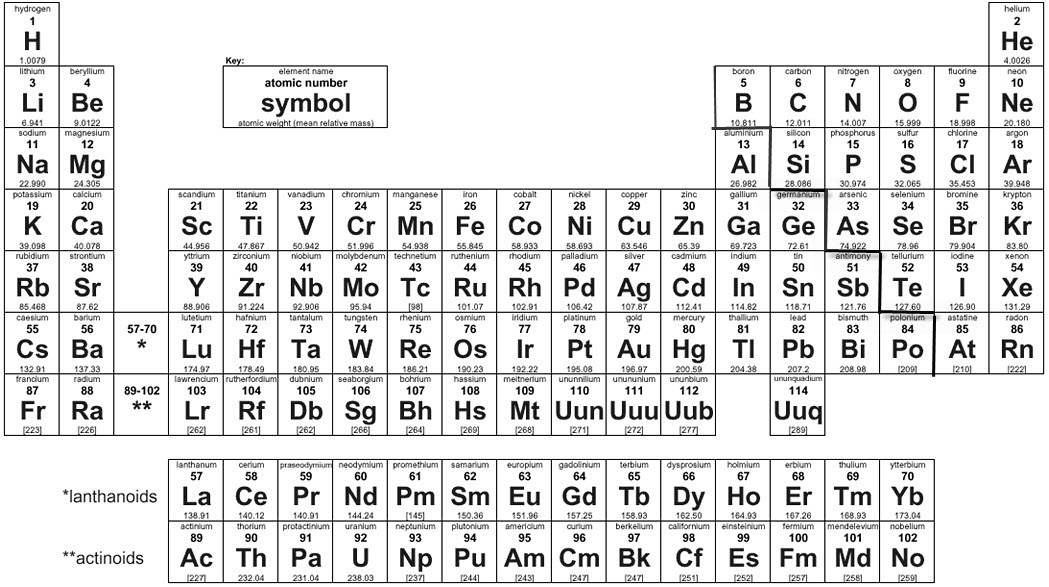
1. Which of the following physical properties can NOT be used to describe a solid?
2. Malleability c) Hardness
3. Viscosity d) Ductility

**Short Answer**

1. On the periodic table below label and colour the following groups:

a) alkali metals b) halogens

c) noble gases d) metalloids



1. Complete the following table with the correct names for the physical changes of state:

|  |  |  |  |
| --- | --- | --- | --- |
| Solid to liquid | melting | Liquid to solid | freezing |
| Liquid to gas | **evaporation** | Gas to liquid | condensation |
| Solid to gas | sublimation | Gas to solid | **sublimation** |

1. List the 5 clues of a chemical change.

Colour change; odor/bubbles/gas given off; solid precipitate; heat or light given off; difficult to reverse

1. Name and describe 3 physical properties of milk.

White colour, opaque, low viscosity

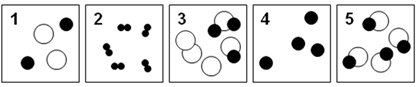
1. For the following statements, indicate whether the statement describes a physical change or a chemical change. **State your reason** – if it is a physical change, indicate what kind of change it is (e.g. change of state). If it is a chemical change, indicate **all** applicable reasons (e.g. colour change, precipitate).

|  |  |
| --- | --- |
| **Statement** | **Physical Change or Chemical Change?**  **State the reason.** |
| Frost forms on a window after you breathe on it in the winter. | Physical change – change of state (sublimation), no new substance formed |
| Clear liquid sodium hydroxide is added to a clear blue liquid, and a whitish solid is formed. | Chemical change – precipitate, irreversible |
| Yeast converts sugars into carbon dioxide, causing bread to rise. | Chemical change – gas produced, irreversible |
| Steel wool scrapes rust off a bike. | Physical change – breaking, scraping, no new substance formed |

1. Name three chemical properties.

Combustible, reacts with acid, reacts with oxygen to corrode

1. Classify each of the diagrams as an element, compound, or mixture.



|  |  |
| --- | --- |
| 1. mixture | 2. element (1 type of atom) |
| 3. mixture | 4. element |
| 5. compound |  |

**Part 2**

1. In a Bohr-Rutherford model of the atom:
2. Where are the protons found? \_\_\_in the nucleus\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Where are the neutrons found? \_\_\_\_\_\_\_\_in the nucleus\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Where are the electrons found? \_\_\_in energy levels around the nucleus\_\_
5. Which particles make up most of the mass of the atom? \_protons and neutrons\_
6. Name the scientist who made each of the following chemistry discoveries.
7. Discovered electrons \_\_JJ Thomson\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. Discovered that electrons are in orbitals with different energy levels \_\_Niels Bohr\_\_\_\_\_\_\_
9. Stated that matter was made of solid spherical atoms \_\_\_Dalton\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
10. Discovered neutrons \_\_Chadwick\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
11. His gold foil experiment showed atoms had nuclei and were mostly composed of empty space \_\_\_Rutherford\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
12. Explain how to find the number of protons, electrons and neutrons in an atom using the atomic number and atomic mass.

\_\_atomic number = #protons, # electrons\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_atomic mass – atomic number = #neutrons\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What is the difference between a period and a group on the periodic table?

\_\_\_period = row in the periodic table\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_group = column in periodic table \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Complete the following table.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Position in the Periodic Table** | **Ability to React With Other Elements** | **Number of Electrons in the Outermost Orbital** |
| Alkali Metals | Group 1 | Very reactive | 1 |
| Halogens | Group 17 | Very reactive | 7 |
| Noble Gases | Group 18 | Doesn’t form compounds with other elements | 8 (or 2 for Helium) |

1. Fill in the blanks with the missing numbers.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Element** | **Symbol** | **Atomic Number** | **Atomic**  **Mass Number** | **# of Protons** | **# of Electrons** | **# of Neutrons** | **Standard Atomic Notation** |
| Beryllium | Be | 4 | 9 | 4 | 4 | 5 |  |
| Carbon | C | 6 | 14 | 6 | 6 | 8 |  |
| Silicon | Si | 14 | 28 | 14 | 14 | 14 |  |
| Potassium | K | 19 | 39 | 19 | 19 | 20 |  |
| Sodium | Na | 11 | 23 | 11 | 11 | 12 |  |

1. Indicate whether each of the statements is true or false. If you think the statement is false, rewrite it to make it true. Avoid using negatives and change only one wrong word or phrase.
2. A Bohr-Rutherford diagram shows electrons in layers around the nucleus.

\_\_\_\_energy levels/orbitals/shells\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A neutron is positive and located in the nucleus.

\_\_\_\_neutral\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Elements in the same period have similar properties.

\_\_\_\_groups\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Noble gases are very unreactive liquids.

\_\_\_\_gases\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Alkali metals include sodium, potassium and chlorine.

\_\_\_\_lithium\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Halogens include fluorine, bromine and argon.

\_\_\_\_chlorine\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Metalloids are compounds that have both metallic and nonmetallic properties.

\_\_\_\_\_elements\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

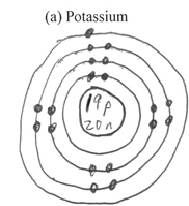
1. The atomic number decreases from left to right across a row of the periodic table.

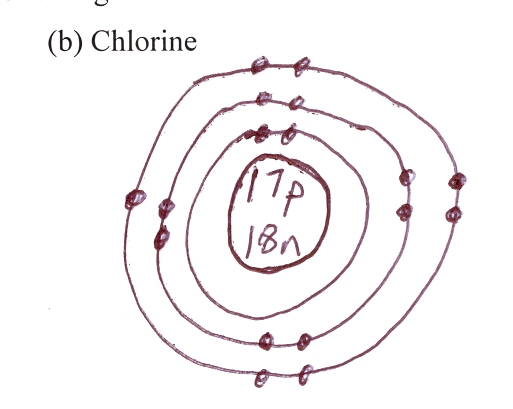
\_\_\_\_\_increases\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Match the description on the left with one term on the right. Use each term only once.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Letter** | **Term** |  | **Match Letter** | **Phrase** |
| A | atomic number |  | F | charged atom |
| B | atomic mass number |  | A | number of protons |
| C | proton |  | C | positive subatomic particle |
| D | neutron |  | G | cation |
| E | atom |  | H | anion |
| F | ion |  | B | sum of protons and neutrons |
| G | positive ion |  | D | uncharged subatomic particle |
| H | negative ion |  | E | smallest unique particle of mattter |

1. Draw Bohr-Rutherford diagrams for each of the following **neutral** atoms.





1. a) What is the difference between a coefficient and a subscript when writing a chemical formula?  
   coefficient – full size, comes before the chemical formula, indicates # of molecules or compounds  
   subscript – half size, to the lower right of the element symbol, indicates # of atoms  
      
   b) Identify the elements in the following compounds and state the numbers of atoms of each.

|  |  |  |
| --- | --- | --- |
| Formula of Compound | Name each Element in the Compound | Number of Atoms of each element |
| 2 NaHCO3 | Sodium | 2 |
| Hydrogen | 2 |
| Carbon | 2 |
| Oxygen | 6 |
| CH3COO(CH2)7CH3 | Carbon | 10 |
| Hydrogen | 20 |
| Oxygen | 2 |
| 3 Fe2O3 | Iron | 6 |
| Oxygen | 9 |

1. Complete this chart for each of the following combinations of elements.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Elements** | **Combining**  **Capacity for each element** | **Bonding (hook) Diagram** | **Formula** | **Name** |
| potassium  and  chlorine | K – 1  Cl - 1 |  | KCl | potassium chloride |
| calcium  and  oxygen | Ca – 2  O - 2 |  | CaO | calcium oxide |
| aluminum  and  sulfur | Al – 3  S - 2 |  | Al2S3 | aluminum sulfide |

NOTE: all of the above examples are substances with ionic bonds. Remember that 2 non-metals form covalent bonds and then you need to use the prefixes in the names.

1. Complete and **memorize** the following chart.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Group #** | **1**  **(alkali metals)** | **2** | **13** | **14** | **15** | **16** | **17 (halogens)** | **18**  **(noble gases)** |
| **# valence electrons** | 1 | **2** | 3 | 4 | 5 | 6 | 7 | 8 (2 for He) |
| **# of bonds formed?** | 1 | **2** | 3 | 4 | 3 | 2 | 1 | 0 |
| **Tend to Gain or Lose Electrons?** | Lose | Lose | Lose | X | Gain | Gain | Gain | X |
| **How Many Electrons?** | 1 | 2 | 3 | X | 3 | 2 | 1 | X |